

## REMARKS

The issues outstanding in the office action's Final Rejection mailed February 7, 2002, are the rejections under 35 U.S.C. §112 and §103. Reconsideration of these issues, in view of the following discussion and the Declaration under 37 C.F.R. 1.132 attached, is respectfully requested.

The examiner is thanked for indicating the withdrawal of the prior objection to the specification.

### Rejections under 35 U.S.C. §112

Claims 14, 16 and 17 have been rejected under 35 U.S.C. §112, second paragraph. Reconsideration of this rejection in view of the foregoing amendment is respectfully requested. It is noted that the amendments have not changed the scope of the claims, either literally or for the purpose of the doctrine of equivalents.

### Rejections under 35 U.S.C. '103

Claims 1-2, 4-5 and 7-18 have been rejected under 35 U.S.C. §103 over *Billion* '209 taken with *Walker* '768 and *Cody et al* '874. Reconsideration of this rejection is respectfully requested.

The office action argues at page 5 that *Billion* teaches that a portion of the residue from patentees' second step can be recycled, citing column 4, lines 14-17 of the reference. However, to be precise, this passage teaches that "preferably" the process is carried out without re-circulating the residue to avoid accumulation of polyaromatic compounds. Patentees continue, "nevertheless, the process can recycle a portion of the residue from the second step. The recycled fraction is then mixed with a product from the first step," see

column 4, lines 12-17. Thus, what the patent teaches is that an unspecified portion of the fractionated oil residue can be recycled not to patentees first step, wherein the cut is contacted with hydrogen and a catalyst containing an amorphous support, group VI and group VIII elements, but to patentees second step, wherein the product of this first step is contacted with a second, zeolite-based catalyst, see column 2, lines 49-55. Thus, the cited reference fails to disclose the presently claimed recycle step, in which a fraction of the oil residue having low viscosity, separated in step c), is recycled to the initial treatment of the feed with hydrogen and the non-zeolitic catalyst.

*Walker* fails to remedy this deficiency, even in combination with *Billion*, inasmuch as the secondary reference does not teach any particular recycle stream. Thus, it is submitted that these references in combination, fail to suggest the presently claimed process, and that a *prima face* case of obviousness has not been established. It is noted that the amendment to claim 1 specifying the recycle modifies solely the recycle element of the claim, and does not affect process steps a), b) or c) either literally or for the purposes of the doctrine of equivalents.

Moreover, it is evident from the comparison of example 2 and comparative example 3 that recycling a fraction having low viscosity would be expected to increase the amount of aromatic carbon in the feedstock and thus decrease viscosity. Accordingly, one of ordinary skill in the art would not be motivated to perform such a recycle, as recycling would be expected to have a deleterious effect on the high viscosity index of the product. For example, note that recycling increases the aromatic carbon content in the residue (prior to thermal diffusion fractionation and after dewaxing) from 2.1 %, in example 3, to 2.8 % in example 2, and slightly lower the viscosity index prior to thermal diffusion, from 129 vs. 132, without recycling.

In addition, the declaration demonstrates substantially improved viscosity index, where fractionation with recycle is performed, see table 6 of declaration. Thus, the declaration demonstrates the expectation in the art, that recycle would impair results due to increased aromatics, see table 5, but further shows that the viscosity index, with fractionation and recycling, is substantially improved, see table 6. One of ordinary skill in the art would simply not expect that fractionation would enable such an improvement in viscosity index, when coupled with recycling.

It is submitted that the declaration thus provides further evidence of non-obviousness of the present invention, and withdrawal of the rejection under 35 U.S.C. §103 is respectfully requested.

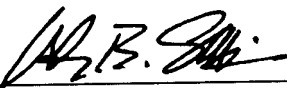
*Cody* does not remedy the deficiencies of the first two discussed references, inasmuch as *Cody* teaches a complicated hydro-conversion process employing seven steps, which is largely non-analogous to the processes of the above discussed references. Thus, it is submitted that one of ordinary skill in the art would not extract any of the teachings of *Cody* for a combination with the primary or secondary references above, in view of such differences. Indeed, it is submitted that the hydroprocessing steps (two of the seven steps of *Cody*) are not comparable to those of the primary references.

Claims 6 and 19-20 have also been rejected under 35 U.S.C. §103 over *Billion* taken with *Walker* and *Garwood et al.* '177. Reconsideration of this rejection is respectfully requested.

*Garwood* is cited solely for its teachings of dewaxing. *Garwood* does not remedy these deficiencies of the above discussed references in that it also fails to suggest the particular recycle as claimed. Thus, it is submitted that this rejection should also be withdrawn.

The claims in the application are submitted to be in condition for allowance.  
However, should the examiner have any questions or comments, she is cordially invited to  
telephone the undersigned below.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 1, 4, 5, and 14-18 have been amended as follows:

1. (Twice Amended)

A process for producing oils with a high viscosity index from a feed containing constituents with boiling points of more than about 300°C comprising

- a) reacting hydrogen with the feed or with a mixture of the feed with at least a fraction of a stream recycled from c), in the presence of a catalyst comprising at least one amorphous non zeolitic matrix and at least one metal or compound of a metal from group VIII of the periodic table and/or at least one metal from group VIB to produce an effluent;
- ~~a') — Fractionating the effluent obtained from a) or d) in at least one separator, into at least one gaseous effluent which is evacuated and into at least one liquid effluent which is sent to b);~~
- b) fractionating at least a portion of the liquid effluent obtained from a) so as to separate at least one oil residue comprising Mainly constituents with viscosity indices, which are higher than that of the feed;
- c) fractionating at least a portion of the oil residue obtained in step b) by thermal diffusion into oil fractions with high viscosity indices and separating the oil fractions in accordance with their viscosity index;  
, and recycling at least part of at least one fraction with low viscosity index from c) to a).

4. (Thrice Amended)

A process according to claim 2, in which at least a portion of

unconverted fractions recovered in a) or d) are recycled either to a) or to d) or partially to both: a) and d)

5. (Thrice Amended) A process according to claim 2, in which recycle streams from c) comprising fractions from c) with low viscosity indices, are recycled ~~either to a) or to d) or~~ at least partially to both said steps: a) and d).
14. (Amended) A process according to claim 9, in which the catalyst of ~~step a)~~ comprises a total concentration of oxides of metals from groups VIB and VIII in the range of about 5% to 40% by weight, with a ratio between the metal ~~(or metals)~~ from group ~~VI~~ VIB and the metal ~~(or metals)~~ from group VIII, expressed as ~~the~~ metal oxides, of about 20 to 1 by weight.
15. (Amended) A process according to claim 9, in which the matrix of the catalyst for ~~step d)~~ is selected from the group consisting of alumina, silica, silica-alumina, alumina-boron oxide, magnesia, silica-magnesia, zirconia, titanium oxide and clay, these compounds being used alone or as a mixture.
16. (Amended) A process according to claim 9, in which the catalyst for ~~step d)~~ comprises a total concentration of oxides of metals from groups VIB and VIII in the range from about 1% to 40% by weight, the ratio between the group ~~VI~~ VIB metal ~~(or metals)~~ and the group VIII metal ~~(or metals)~~, expressed as ~~the~~ metal oxides, being in the range about 20 to 1.25 by weight, and ~~the~~ a concentration of phosphorous oxides being less than about 15% by weight.
17. (Amended) A process according to claim 15, in which the catalyst for ~~step d)~~ comprises a total concentration of oxides of metals from groups VIB and VIII in the range from about 1% to 40% by weight, the

ratio between the group VI metal (~~or metals~~) and the group VIII metal (~~or metals~~), expressed as the metal oxides, being in the range about 20 to 1.25 by weight, and the concentration of phosphorous oxides being less than about 15% by weight.

18. (Thrice Amended)

A process for producing oils with a high viscosity index from a feed containing constituents with boiling points of more than about 300°C comprising

- a) reacting hydrogen with the feed or with a mixture of the feed with at least a fraction of a stream recycled from c), in the presence of a catalyst comprising at least one amorphous non zeolite matrix and at least one metal or compound of a metal from group VIII of the periodic table and/or at least one metal from group VIB to produce an effluent;
- b) fractionating at least a portion of the liquid effluent obtained from a) so as to separate at least one oil residue comprising mainly constituents with viscosity indices, which are higher than that of the feed;
- c) fractionating at ~~least~~ least a portion of the oil residue obtained in step b) by thermal diffusion into oil fractions with high viscosity indices, and separating the oil fractions in accordance with their viscosity index with proviso that b) is not preceded by treatment of the effluent of a) with hydrogen in the presence of a zeolite.



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of

BRIOT ET AL.

Examiner: Nadine Preisch

Serial No.: 09/644,605

Group Art Unit: 1764

Filed: August 24, 2000

For: PROCESS FOR PRODUCING OIL WITH A HIGH VISCOSITY INDEX.

**DECLARATION UNDER 37 C.F.R. §1.132**

ASSISTANT COMMISSIONER FOR PATENTS  
WASHINGTON, D.C. 20231

SIR:

I, Germain Martino, duly warned, declare and say as follows:

THAT, I am a French citizen; that I graduated from "Faculté des Sciences de l'Université de Strasbourg" (France) in 1961; that I obtained an Engineer Diploma from "Ecole Nationale Supérieure de Pétrole et des Moteurs" Rueil-Malmaison (France) in 1963; that I was received as a Doctor by "Université de Louvain" (Belgium) in 1965; and that I now reside in 78300 Poissy (France), 80 avenue Fernand-Lefebvre;

THAT, I was engaged by "Institut Français du Pétrole" Rueil-Malmaison (France) in their Research Department to research on catalytic agents and catalytic reactions in May 1967; that, from January 1985 to September 1989, I was Manager of the Kinetics and Catalysis Research Division; that, from September 1989 to December 1997, I was Assistant Manager of the whole Refining and Petrochemical Division; and that since then I have been Manager of said Refining and Petrochemical Division.

I declare further:

THAT, I am familiar with the contents of U.S. Patent Application Serial No. 09/644,605, which relates to a PROCESS FOR PRODUCING OIL WITH A HIGH VISCOSITY INDEX.



### Comparative Example 3:

The present example illustrates the impact on the process of the invention, when there is no recycling of any fraction obtained during thermal diffusion step c).

The operating conditions and the nature of the feedstock are identical to the one used in Example 2, apart from the recycling that did not take place.

The properties of the residue obtained prior to the thermal diffusion fractionation (and after the solvent dewaxing step) are presented in table 5. The properties of the residue obtained in Example 2, with the recycling of the fractions 7 to 9, are compared and presented in the same table 5.

TABLE 5

Characteristics	Feed	Residue (with recycle) Example 2	Residue (without recycle) Example 3
Density at 15°C (kg/m <sup>3</sup> )	969	847.9	846.1
Refractive index at 20°C	1.5474	1.4687	1.4543
Kinematic viscosity at 40°C (mm <sup>2</sup> /s)	250	35.51	34.49
Kinematic viscosity at 100°C (mm <sup>2</sup> /s)	15.13	6.31	6.25
Viscosity Index	34	129	132
Pour Point (°C)	- 27	- 21	- 21
Ca (%)	29.3	2.80	2.1
Cp (%)	60.5	84.79	86.3
Cn (%)	10.2	12.41	11.6

The fractionation by thermal diffusion led to nine fractions, each of them having approximately the same viscosity index, in comparison to the corresponding fraction obtained in Example 2. Those fractions were blended in two streams, having

properties that are presented in Table 6. Stream I and II correspond respectively to the blend of fractions 1 to 6 and 7 to 9.

TABLE 6

	Stream I	Stream II
Yields (weight%)	66	34
Kinematic viscosity at 40°C (mm <sup>2</sup> /s)	23.29	160.95
Kinematic viscosity at 100°C (mm <sup>2</sup> /s)	5.14	13.66
Viscosity Index	158	75

Stream I is obtained with a conversion of 66% by weight and exhibit a remarkable viscosity index of 158. However, the remaining part, i.e. stream II, was of limited interest due to a low viscosity index of 75.

This illustrates the limitation of the process, in terms of conversion, when there is no recycling of any fraction obtained by thermal diffusion.

#### **Comparison between Example 2 and Example 3:**

In example 2, fractions 7 to 9 were recycled upstream with the feedstock of the claimed process. Two streams were obtained from the blend of fractions 1 to 4 and the blend of fractions 5 and 6. Both resulting streams had viscosity indices varying within the commercially acceptable ranges of 120-130 and 150-205. In addition, both streams were obtained with a conversion close to 100% and with an average viscosity index, which is above 150.

In conclusion, the recycling used in Example 2 allows the production of lube oil having a high viscosity index and with a maximized conversion rate.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

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Germain MARTINO

Date: May 24, 2002